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The southern African species of *Astymachus* Howard and *Rhopus* Foerster (Hymenoptera: Encyrtidae)

by

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Astymachus exilis spec. nov. is described from South Africa and represents the first record of this genus from the Afrotropical region. A key to the females of the three known species of *Astymachus* Howard is given. The following seven species of *Rhopus* Foerster, a genus previously recorded from the Afrotropical region through undetermined species, are described as new from South Africa: *discretus, luridus* and *pilatus*, which belong to the subgenus *Rhopus*, and *adustus, geminus, notius* and *urbanus* of the subgenus *Xanthoencyrtus*. A key to the females of these species is provided.

INTRODUCTION

This paper deals with the southern African species of *Astymachus* Howard and *Rhopus* Foerster, two encyrtid genera which are superficially similar, but phylogenetically unrelated. *Astymachus*, which belongs to the Encyrtinae, is recorded here for the first time from the Afrotropical region, whereas *Rhopus* Foerster (Tetracneminae) was previously known from the area through undescribed species only (Prinsloo & Annecke 1979). In all, eight species are dealt with, all of which are described as new.

Type-material of the new species is in the National Collection of Insects, Pretoria, unless stated otherwise. The following abbreviation is used: BMNH = British Museum (Natural History), London.

Genus *Astymachus* Howard

Astymachus Howard, 1898: 238.

Type-species: *Astymachus japonicus* Howard, by monotypy.

This small encyrtine genus was hitherto known from only two species: the type-species, *A. japonicus* Howard, which has been recorded from Japan, India, Pakistan and Malaysia (Noyes & Hayat 1984), and *A. phragmites* Trjapitzin, which was described from the U.S.S.R. (Trjapitzin 1962). A third species, *A. exilis* spec. nov. is described from the Transvaal, which greatly increases the known distribution range of this poorly known genus. The relationships of *Astymachus* within the subfamily Encyrtinae are not clear, and it is not closely allied to any other Afrotropical genus known to me. It has been

placed in the monobasic tribe Astymachini by Trjapitzin (1973), as the sole included genus.

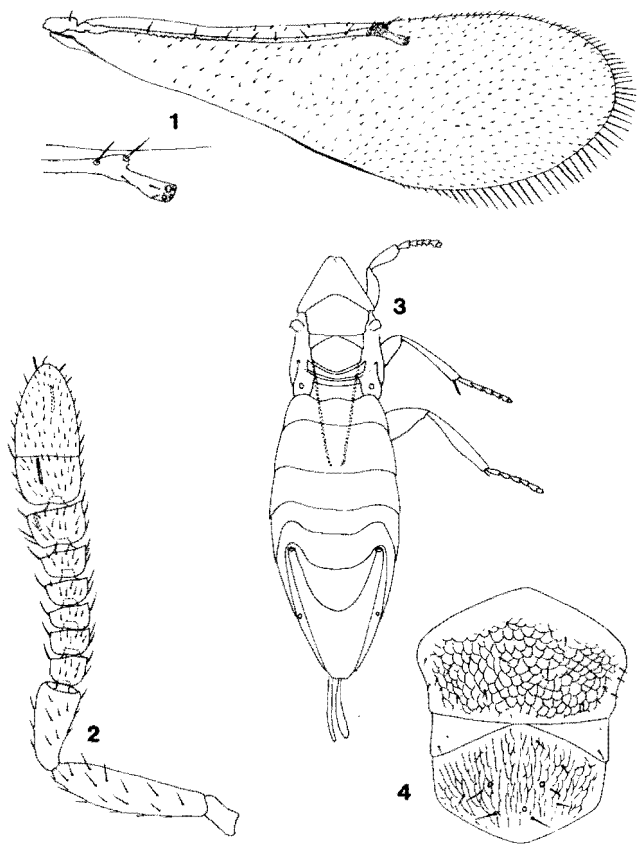
The new species from South Africa is closely related to its two extra-African congeners, material of which was available for comparison. The male of *A. exilis* is not known, but the female differs mainly from *A. japonicus* and *A. phragmites* in colour, antennal dimensions and mesonotal setation, as indicated in the following key:

1 Antennal club not segmented; mesonotum fairly densely setose, the mesoscutum and scutellum respectively with more or less 34 and 20–24 setae; Palaearctic ..... *phragmites*
— Antennal club with two segments; mesonotum distinctly less densely setose, the mesoscutum and scutellum each with about one-half the number of setae than above; not known from the Palaearctic region 2
2 Body entirely yellow; antenna with funicle segment V almost equal in size to segment VI, almost twice as long as segment IV; Oriental ..... *japonicus*
— Thorax and abdomen brown, the pro- and mesonotum with a broad, pale, longitudinal median band; funicle segment V notably shorter than segment VI, about the same length as segment IV; Afrotropical ..... *exilis*

Astymachus exilis spec. nov., Figs 1–4

FEMALE. Length: about 1,3 mm, excluding the strongly exserted ovipositor. Colour: head pale yellowish-white (probably more extensively yellow in non faded specimens), the genae suffused with brown; remainder of body brown, the pro- and mesonotum with a broad yellowish-white longitudinal median band, which extends from the apex of the scutellum to the head, leaving only the sides of this part of the thoracic dorsum brown; antenna largely brown, the pedicel with blackish suffusions; legs almost entirely pallid, much the same as the head and median part of mesonotum, only the femora slightly darker in parts; wings hyaline, the fore wing with a small dark spot just below the marginal vein; protruding part of ovipositor typical of the genus, pale basally, blackish apically.

Head and body foliaceously flattened in dried specimens, the head characteristic of the genus, opistognathous, the frontovertex horizontal, the face deflected ventrocaudad; frontovertex about one-half as wide as the head; ocelli in an acute-angled triangle, the lateral pair separated from the inner eye margins by more or less twice their own diameter; antennal sockets placed a little above the lower eye margins on the ventrally positioned face, just more than twice their own diameter apart at their smallest interval; scrobes indiscernible in the two card-mounted specimens. Antenna (Fig. 2) with scape not expanded below, four times as long as broad; pedicel about as long as the basal three funicle segments combined; funicle with all segments transverse, I about 1,3 times as wide as long, II–V subequal in size, each slightly less than twice as wide as long; segment VI notably larger than the preceding segments, about 1,5 times as wide as long; club a little shorter than the distal five funicle segments combined, rounded apically; club two-segmented, the septum very fine; funicle segment VI and both club segments with rhinaria; antennal setation as in Fig. 2. Mandible distinctly tridentate; maxillary palpi each with four segments, the labial palpi two-segmented. Head weakly sculptured, appearing somewhat smooth and slightly polished in dry specimens; sculpture of frontovertex (in the slide-mounted specimen) much as illustrated for the scutellum (Fig. 4), consisting of fine, longitudinally orientated lines which are not always connected to form distinct cells; frontovertex sparsely, unevenly and finely setose; eyes appearing naked.



Figs 1–4. *Astymachus exilis* spec. nov., female holotype. 1. Fore wing, with venation enlarged. 2. Antenna. 3. Thorax and abdomen. 4. Mesonotum.

Thorax as in Fig. 3, the pronotum almost triangular, subequal in length to the mesoscutum, the latter just more than 1,5 times as wide as long; scutellum 1,5 times as wide as long; mesonotal sculpture weak, the integument appearing rather smooth in dry specimens, but clearly discernible the slide-mounted specimen, as in Fig. 4; mesonotum sparsely and finely setose, the mesoscutum with 18 setae, the scutellum with ten in the single slide-mounted female; mesophragma well developed, extending into the abdomen to a level near the distal margin of the second gastral tergite.

Fore wing (Fig. 1) long and slender, about 3,3 times as long as broad; venation as illustrated, the marginal vein longer than broad, not reaching the cephalic wing margin, the postmarginal vein punctiform; marginal fringe well developed, the longest marginal cilia about 0,2 times as long as the width of the wing; wing disc sparsely setose,

the setae short and fine, as in Fig. 1; hind wing 6,3 times as long as broad, the marginal fringe long, the longest cilia about one-half as long as the greatest width of the wing. Middle leg with tibial spur a little shorter than the basal tarsal segment.

Gaster more than twice as long as the thorax and propodeum combined, as in Fig. 3; ovipositor 2,3 times as long as the middle tibia, twice the length of the gonostyli, the latter laterally compressed, broadening from base to apex, the latter rounded; gonostyli protruding at the gastral apex by more or less 0,25 times their length.

MALE. Unknown.

MATERIAL EXAMINED. Female holotype, 2 female paratypes as follows: SOUTH AFRICA: Nylsvley Provincial Nature Reserve, nr. Naboomspruit, Transvaal, x.1978, D. P. Annecke, by suction trap (T 5231).

REMARKS: This species is described from material collected by a suction trap placed in acacia savanna in the northern Transvaal. The specimens were originally preserved in alcohol and are somewhat faded.

Genus *Rhopus* Foerster

Rhopus Foerster, 1856: 34.

Type-species: *Encyrtus piso* Walker, by original designation.

Much has been written on the taxonomic status of this genus, and nothing needs to be added here. Noyes & Hayat (1984) provide references to all the genera which are now regarded as being synonymous with *Rhopus*. These include: *Xanthoencyrtus* Ashmead, 1902, *Scelioencyrtus* Girault, 1915, *Mirastymachus* Girault, 1915, *Pholidoceras* Mercet, 1918 and *Pholidocerodes* Ferrière, 1956.

The genus *Rhopus* is regarded as having two subgenera: *Rhopus*, in which the female antenna has a three-segmented club; and *Xanthoencyrtus*, in which the club is two-segmented. Species of both these subgenera are dealt with here. Although the genus was mentioned in a key to the genera of Afrotropical Encyrtidae by Prinsloo & Annecke (1979), these species are the first to be described from the region.

The genus in southern Africa, which includes the seven new species described below, in addition to three undescribed species represented by insufficient material, is characterized as follows:

FEMALE. Small (more or less 1,0 mm), weakly sclerotized tetracnemine encyrtids, which often shrink in dry material. Colour: yellowish to brown, somewhat shiny, without a metallic lustre; wings generally hyaline, the fore wing at most faintly infuscated basally.

Head, in dorsal view, thin anteroposteriorly, the frontovertex mostly in the horizontal plane, the latter broad, 0,6–0,8 times as wide as the head at median ocellus; occiputal margin acute; ocelli in a strongly obtuse-angled triangle, the lateral pair well removed from the inner eye margins; head, in frontal view, wider than long, the eyes ranging from about as long as, to longer than, the malar space; toruli usually placed close to the mouth margin, their upper limits below the lower level of the eyes; scrobes poorly developed, often indistinct, or present as two shallow, slightly convergent furrows which are separated by a broad, weakly convex prominence. Antenna with funicle six-segmented, the segments often irregular in shape, the club rarely not clavate, with two (subgenus *Xanthoencyrtus*) or three (subgenus *Rhopus*) segments. Mandible with two slender, acute teeth; maxillary palpi each with two segments, the labial palpi not

segmented. Sculpture of head at most weakly developed, sometimes indistinct; entire-frontal aspect of head (except the scrobal area) setose, the setae fine and straight, the vertex with two long, spine-like setae, one each between a lateral ocellus and an eye margin.

Thorax somewhat depressed, thin dorsoventrally, flat dorsally; pronotum strongly transverse, divided medially as in Figs. 13, 17, 22; mesoscutum and scutellum both wider than long, the latter tapering to a rounded apex; axillae at most slightly elevated, narrowly divided mesally where they are slightly overlapped by the hind margin of the mesoscutum; mesonotum weakly sculptured, the setation varying interspecifically, the setae straight, the scutellum usually with a pair of long setae at its apex; mesophragma extending to the level of the first gastral segment.

Fore wing ranging from about 2,4 to 3,3 times as long as broad, the marginal fringe present, varying in length; basal part of fore wing fairly sparsely to densely setose, the speculum complete or interrupted by a few setae; apical one-half or so of costal cell with a single row of setae on the upper surface; apex of venation with marginal and postmarginal veins clearly separated from the cephalic wing margin, these veins short, the postmarginal sometimes punctiform; hind wing with long marginal fringe, the longest cilia at least almost one-half as long as the width of the wing. Legs not especially modified, the middle tibal spur shorter than the basal tarsal segment of the middle leg.

Abdomen and structure of ovipositor typical of the Tetracneminae; abdomen longer than the thorax, slender, acutely pointed apically, the cercal plates placed closer to the base than to the apex of the gaster; paratergites well developed, visible in cleared slide-mounted specimens as thin linear sclerites; ovipositor short, always much shorter than the gaster, the gonostyli short, triangular in shape, protruding at most very slightly at the gastral apex.

MALE. Colour: much the same as in the female. Differing structurally from the female mainly in the toruli which are placed a little higher on the face, and in the antenna; antenna with six elongate funicle segments, the distal one usually with a row of flattened scale-like setae (Fig. 24), the segments otherwise with long, curved setae which are longer than the corresponding segments; club not segmented, at most slightly longer than the distal two funicle segments combined.

The seven species of *Rhopus* which are now known from southern Africa can be separated by the following key.

FEMALES

1 Antennal club three-segmented: subgenus *Rhopus* 2
— Club two-segmented: subgenus *Zanthoencyrtus* 4
2 Antenna (Fig. 8) slender, the funicle segments all longer than wide, the club not broader than the funicle, shorter than the distal three funicle segments combined; all funicle segments with rhinaria; head, in frontal view (Fig. 6), with eyes subequal in length to the malar space ..... *discretus*
— Antenna (Figs 10,15) with at least funicle segments II-VI each wider than long, the club strongly clavate, broader than the funicle, plainly longer than the distal three funicle segments combined; not all funicle segments with rhinaria; eyes distinctly longer than the malar space (Fig. 14) 3
3 Fore wing (Fig. 12) about 3,3 times as long as broad, the speculum not interrupted; antennal funicle devoid of rhinaria (Fig. 15); mesoscutum densely setose, with more or less 70 fine setae; ovipositor almost as long as the middle tibia ..... *pilatus*

— Fore wing about 2,6 times as long as wide, the speculum interrupted in its caudal half (Fig. 11); funicle segments III and V with rhinaria (Fig. 10); mesoscutum less densely setose, with fewer than 20 setae; ovipositor 0,6 times as long as the middle tibia ..... *luridus*

4 Fore wing about three times (3,1–3, 2:1) as long as wide, the longest marginal cilia at least 0,25 times as long as the greatest width of the wing; speculum not interrupted (Fig. 16); antenna (Fig. 19) with pedicel about as long as the basal three funicle segments combined; scutellum with less than 20 setae ..... *geminus*

— Fore wing broader, less than three times as long as wide, the marginal fringe shorter, less than 0,25 times as long as the width of the wing; speculum interrupted by one or more setae in its caudal half (Figs 20,27); pedicel shorter than the basal three funicle segments combined; scutellum with at least 30 setae 5

5 Antennal club longer than the distal five funicle segments together; funicle with basal segment slightly wider than long, about as long as the second segment (Fig. 21); head about 1,4 times as wide as the frontovertex at median ocellus, the eyes, in frontal view, 1,4 times as long as the malar space ..... *urbanus*

— Antennal club at most as long as the distal five funicle segments combined; funicle segment I longer than wide and longer than segment II (Figs 26,29); head about 1,7 times as wide as the frontovertex, the eyes 1,7 times as long as the malar space 6

6 Head and body entirely yellow, the antennal flagellum blackish-brown in contrast to the pale pedicel and scape; all funicle segments with rhinaria; scutellum with at least about 70 setae ..... *notius*

— Head and body largely brown, the antenna more or less uniformly brown; funicle segment II without rhinaria; scutellum less densely setose, with much fewer than 70 setae ..... *adustus*

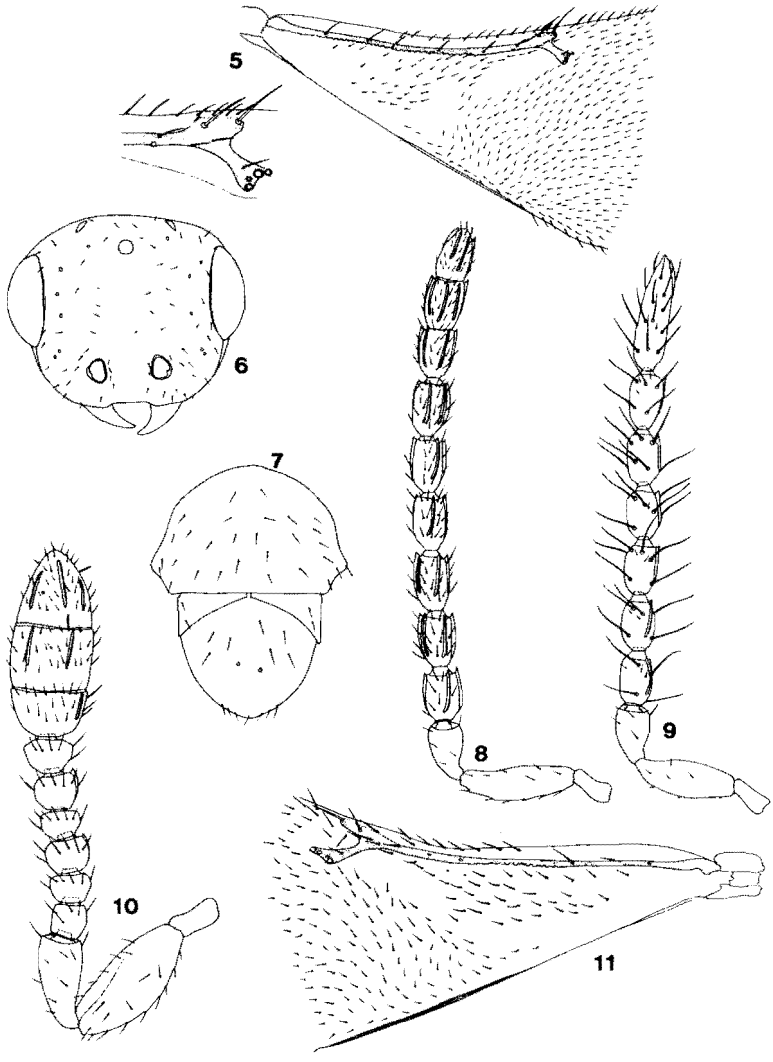
Subgenus *Rhopus*

Some 20 described species can be attributed to this subgenus, almost all of which are known from the Palaearctic and Nearctic regions, besides two species from India and one from South America. The identity of many of these species is obscure, and they are known only from poor original descriptions. Based on the available material and the literature, in particular the keys provided by Timberlake (1920), Erdös (1957) and Hayat (1969), the three new species from South Africa can be distinguished from their extra-African congeners by a combination of characters which include colour, antennal shape, width of fore wing and the length of the marginal fringe, and thoracic setation. The South African species can be separated from each other as indicated in the foregoing key. Apart from the species dealt with here, two further apparently new species from the area are known from insufficient study material.

Rhopus (Rhopus) discretus spec. nov., Figs 5–9

FEMALE. Length: about 0,8 mm. Colour: head, body and legs much the same, mostly yellowish-brown to brown, the antennae generally a little darker, the tarsal tips blackish; wings very slightly infuscated.

Head, in dorsal view, about three times as wide as its median length, the posterior margin almost straight, the anterior margin gently rounded at the sides; head about 1,3 times as wide as the vertex at median ocellus; lateral ocelli separated from the eye margins by less than four times their own diameter, about five times their diameter apart; head, in frontal view (Fig. 6) with eyes small, about equal in length to the malar space; scrobes in the shape of two very shallow and indistinct impressions above the toruli; toruli about 1,7 times their own diameter apart, their upper limits just below the lower eye level. Antenna (Fig. 8) with scape 3,5 times as long as broad; pedicel just



Figs 5–11. *Rhopus (Rhopus)* spp. 5–9. *R. discretus* spec. nov., paratypes. 5. Basal part of fore wing, with venation enlarged, female. 6. Head, frontal view, female. 7. Mesonotum, female. 8. Antenna, female. 9. Antenna, male. 10–11. *R. luridus* spec. nov., female paratype. 10. Antenna. 11. Basal part of fore wing.

longer than the basal funicle segment; funicle segments subequal in size, each more or less 1,5 times as long as broad; club unusually slender, as wide as the funicle, the segments generally similar in shape than those of the funicle; club three-segmented, a little shorter than the distal three funicle segments combined; all funicle and club segments with long, strongly developed rhinaria. Sculpture of frontovertex and face much the same, weakly reticulate, the integument appearing somewhat smooth in dry specimens under low magnification; head relatively sparsely setose, as in Fig. 6. Eyes weakly pubescent.

Mesoscutum and scutellum (Fig. 7) respectively about 1,5 and 1,1 times as wide as long; mesonotum much less densely setose as in many of the other species dealt with here; mesoscutum with about 18–29 setae, the axillae each with two or three; scutellum with five to seven fairly long scattered setae on the disc in addition to six to eight finer setae along the apical margin, the apex without the usual long pair; mesonotal sculpture weakly cellulate-reticulate, the cells large.

Fore wing 2,8 times as long as broad; marginal fringe well developed, the longest cilia about 0,3 times as long as the width of the wing; basal part of fore wing fairly sparsely setose, with setation as in fig. 5, the speculum broad, interrupted as illustrated; the postmarginal vein very short, but distinct, as in Fig. 5; hind wing just more than seven times as long as broad, the longest marginal cilia about one-half as long as the width of the wing.

Ovipositor very short, approximately one-half as long as the middle tibia.

MALE. Colour: differing from the female in that the whole insect is darker, largely dark brown. Differing structurally as follows: toruli with upper limits level with the lower eye margins; antenna (Fig. 9) with scape three times as long as broad; relative dimensions of pedicel and funicle much as in the female; club slightly longer than the distal two funicle segments combined; flagellar setation as illustrated, funicle segment VI without a row of flattened scale-like setae.

MATERIAL EXAMINED. Female holotype, 7 female, 6 male paratypes as follows: SOUTH AFRICA: Fouriesburg, Orange Free State, C. Kok & S. J. van Tonder, ii.1980, by sweeping (T 6277); 1 female paratype in BMNH.

REMARKS. This new species differs from all other species of the subgenus known to me by the somewhat unusual female antenna (Fig. 8) in which the funicle segments are all longer than wide and the club slender, hardly clavate, not broader than the funicle. An undescribed species with a similarly shaped antenna from the Indo-Pacific region is illustrated by Noyes & Hayat (1984).

Rhopus (Rhopus) luridus spec. nov., Figs 10–11

FEMALE. Length: 0,8–0,9 mm. Colour: head, body and legs (except the dark tarsal tips) more or less uniformly yellow; antenna with scape and pedicel pale except for the dorsal aspect of the former and base of the latter which have darker suffusions; flagellum blackish; wings hyaline.

Head, in dorsal view a little more than four times as wide as its median length, the anterior and posterior margins almost straight; head about 1,3 times as wide as the vertex at median ocellus; lateral ocelli separated from the inner eye margins by a little less than four times their own diameter; head, in frontal view, much as illustrated for *R. pilatus*, the eyes about 1,7 times the length of the malar space; toruli very close to the

mouth margin, twice their own diameter apart; scrobes bearly discernible. Antenna (Fig. 10) with scape about 2,3 times as long as broad; pedicel a little shorter than the basal three funicle segments together; all funicle segments wider than long, I rectangular in shape, II–VI unevenly shaped, slightly moniliform, segment IV notably smaller than each of II, III, V and VI which are subequal, as illustrated; club just shorter than the entire funicle, strongly clavate, three-segmented; funicle segments III and V with rhinaria. Integument of vertex and face appearing weakly reticulate in dried specimens, indistinct in the slide-mounted specimen; eyes finely pubescent; frontal aspect of head a little less densely setose than illustrated for *R. pilatus*.

Mesoscutum and scutellum respectively about 1,4 and 1,3 times as wide as long; mesonotum sparsely setose, the mesoscutum with fewer than 20 fine setae, the axillae each with four; disc of scutellum with 12 setae, the apical margin with a row of 10 finer setae in the single slide-mounted paratype; mesonotal sculpture much as on head, the integument with a somewhat smooth appearance under low magnification.

Fore wing about 2,6 times as long as broad; marginal fringe well developed, the longest cilia about 0,2 times as long as the width of the wing; basal part of wing disc with setation as in fig. 11, sparsely setose compared to *R. pilatus*, the speculum broad, interrupted by one or two setae in its caudal half; marginal vein not clearly delimited, appearing subequal in length to the postmarginal which is clearly longer than broad; hind wing about six times as long as wide, the longest marginal cilia about one-half the length of the wing width.

Ovipositor very short, just more than one-half the length of the middle tibia.

MALE. Unknown

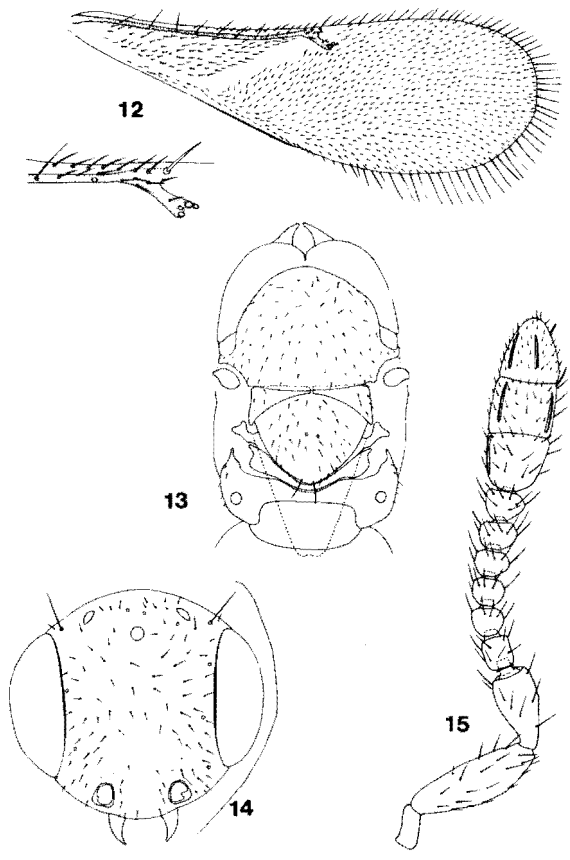
MATERIAL EXAMINED. Female holotype, 2 female paratypes as follows: SOUTH AFRICA: Fouriesburg, Orange Free State, C. Kok & S. J. van Tonder, ii.1980, by sweeping grass (T 6276).

REMARKS. This new species is described from a short series of female speciemens collected together with the material from which the previous species was described. Apart from sharing the subgeneric character of a three-segmented club, the two species do not resemble each other closely, and they are clearly separated by the characters given in the foregoing key. *R. luridus* is more closely allied to *R. pilatus* spec. nov., but differs from that species in the broader fore wing and interrupted speculum, in the mesoscutum which is far less densely setose and in antennal structure, to name the most obvious differences.

Rhopus (Rhopus) pilatus spec. nov., Figs 12–15

FEMALE. Described from slide-mounted material only. Length: 1,1 mm. Colour: head, body and legs unicolorous, entirely yellowish; antenna with radicle, scape and pedicel yellowish, the flagellum notably darker; wings hyaline.

Head, in frontal view (Fig. 14) 1,5 times as wide as the frontovertex; lateral ocelli separated from the inner eye margins by about twice their own diameter; eyes about twice as long as the malar space; toruli close to the mouth margin, separated from each other by about twice their own diameter; scrobes visible as two short and broad depressions above the toruli. Antenna (Fig. 15) with scape 2,7–2,9 times as long as broad; pedicel a little longer than the basal two funicle segments combined; funicle segment I quadrate or slightly longer then wide, rectangular in shape; segments II–VI



Figs 12–15. ***Rhopus (Rhopus) pilatus*** spec. nov., female holotype. 12. Fore wing, with venation enlarged. 13. Thorax. 14. Head, frontal view. 15. Antenna.

slightly moniliform in shape, each wider than long, becoming gradually a little larger apically, as illustrated; club just shorter than the entire funicle, distinctly clavate, three-segmented; funicle devoid of rhinaria. Sculpture of vertex and face very weakly reticulate, barely discernible in the cleared, slide-mounted material; frontal aspec of head densely setose as shown in Fig. 14, the pair of long spine-like setae at the upper level of the eyes strongly developed; eyes densely pubescent.

Thorax as in Fig. 13, the mesoscutum and scutellum both about 1,1–1,2 times as wide as long; mesonotum relatively densely setose, the mesoscutum with more or less 70 setae; disc of scutellum with 28–34 fine setae in addition to a row along the apical margin and one pair of long setae at the apex; axillae each with four to seven setae; mesonotal sculpture appearing much the same as on the head, barely discernible.

Fore wing (Fig. 12) narrow, 3,3 times as long as broad; marginal fringe relatively long, the longest cilia one-fourth as long as the width of the wing; basal part of fore wing densely setose with a broad asetose streak which extends parallel to the caudal wing margin; speculum complete, not interrupted; remainder of wing disc densely setose; marginal vein longer than the almost punctiform postmarginal; hind wing about ten times as long as broad, the longest marginal cilia as long as the width of the wing.

Ovipositor almost as long as the middle tibia (0,9:1), a little more than six times as long as the broadly triangular gonostyli, the latter protuding slightly at the gastral apex.

MALE. Unknown.

MATERIAL EXAMINED. Female holotype, 1 female paratype as follows: SOUTH AFRICA: Orange Free State: Glen, near Bloemfontein, xii.1958, D. P. Annecke, by suction trap (holotype, T 1317); same data except i.1959 (Paratype, T 1319).

REMARKS. This new species can be separated from the other two Afrotropical species of the subgenus *Rhopus* as indicated in the foregoing key. It is more closely allied to *R. luridus* than to *discretus*, as discussed in the notes on the former species.

Subgenus *Xanthoencyrtus*

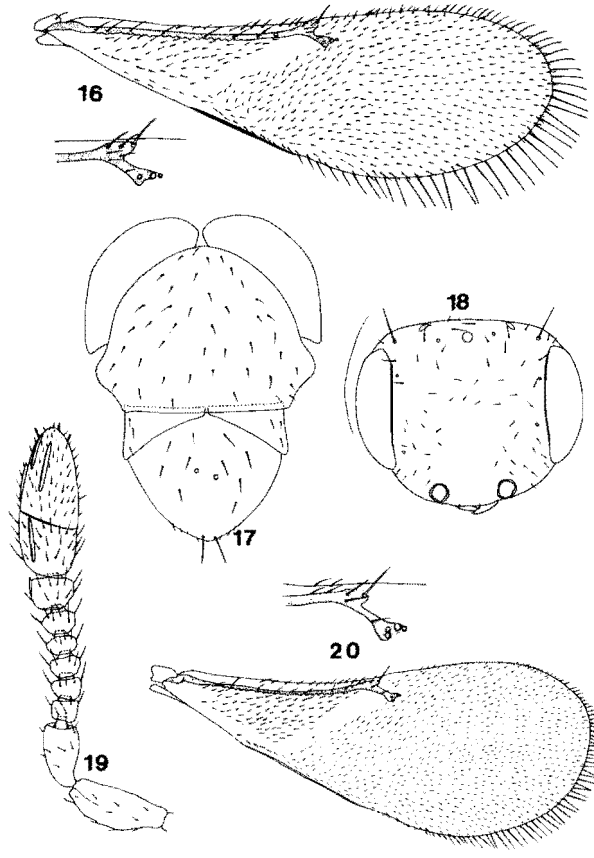
Fifteen species, of which the majority is known from Europe and the Indo-Pacific region, have so far been attributed to this subgenus. Four new species from southern Africa are described here.

Rhopus (Xanthoencyrtus) geminus spec. nov., Figs 16–19

FEMALE. Length: 0,6–0,8 mm. Colour: head, thorax, abdomen and legs yellow; wings hyaline; antenna with radicle, scape and pedicel largely yellow, the latter two segments with slighly darker suffusions dorsally and basally respectively; flagellum generally blackish-brown, the club appearing slightly darker.

Head, in frontal view (Fig. 18) about 1,4 times as wide as the frontovertex; lateral ocelli about seven times their own diameter apart, 3,5 times their diameter from the lateral eye margins; eyes about 1,8 times the length of the malar space; scrobes indiscernible in dried as well as slide-mounted specimens; toruli close to mouth margin, almost three times their own diameter apart. Antenna (Fig. 19) with scape about 2,7 times as long as broad; pedicel as long as the basal three funicle segments combined; all funicle segments wider than long; segment I more or less rectangular in shape, about 1,5 times as wide as long; segments II–V slightly wider, more irregular in shape, subequal in size; segment VI plainly larger than each of the preceding segments, about 1,5 times as wide as long; club distinctly clavate, two-segmented, as long as or slightly longer than the entire funicle; funicle segment VI and club with rhinaria. Head less densely setose than in the other species of the subgenus dealt with here, as shown in Fig. 18; eyes distinctly pubescent; head appearing weakly reticulate in dried specimens, the sculpture indiscernible in slide-mounts.

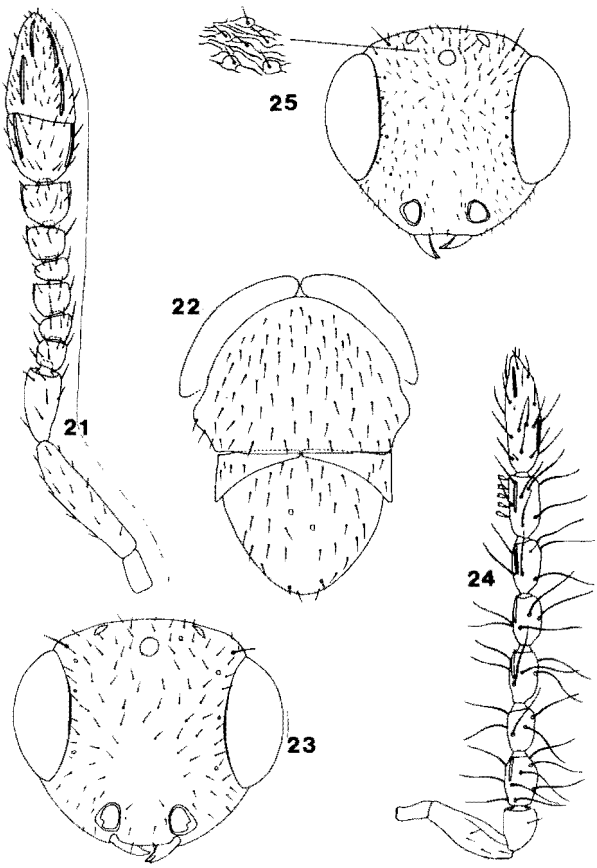
Pro- and mesonotum as in Fig. 17, the mesoscutum and scutellum respectively about 1,3 and 1,1 times as wide as long; thoracic sculpture much as on head; mesonotum relatively sparsely setose, the mesoscutum with more or less 32 setae; axillae each with



Figs 16–20. *Rhopus (Xanthoencyrtus)* spp. 16–19. *R. geminus* spec. nov., female. 16. Fore wing, holotype. 17. Pro-and mesonotum, paratype. 18. Head, frontal view, holotype. 19. Antenna, paratype. 20. *R. urbanus* spec. nov., fore wing with venation enlarged, female holotype.

two or three setae; scutellum with 10–13 fairly long discal setae, in addition to one strongly developed pair at the apex and a row of 6–8 fine, short setae along the apical margin.

Fore wing (Fig. 16) narrow, 3,1–3,2 times as long as broad; marginal fringe long, the longest cila about 0,3 times as long as the width of the wing; wing disc fairly densely setose as illustrated, the basal part with an asetose streak near the caudal margin which extends distally into the speculum, the latter not interrupted; marginal and postmarginal veins both short, as in fig. 16; hind wing about seven times as long as broad, the longest marginal cilia about 0,7 times as long as the width of the wing.



Figs 21–25. *Rhopus (Xanthoencyrtus)* spp. 21–24. *R. urbanus* spec. nov. 21. Antenna, female holotype. 22. Pro-and mesonotum, female holotype. 23. Head, frontal view, female holotype. 24. Antenna, male paratype. 25. *R. notius* spec. nov., head, frontal view, with sculpture on vertex enlarged, female paratype.

Ovipositor very much shorter than the gaster, slightly shorter (0,9:1) than the middle tibia.

MALE. Unknown. two slide-mounted male specimens from the same series as the females are available. In these specimens, the fore wing is broader, the marginal fringe shorter and the scutellum far more densely setose than in the female. I therefore regard the male specimens as belonging to a different species.

MATERIAL EXAMINED. Female holotype, 5 female paratypes (T 1613) as follows: SOUTH AFRICA: Hennops River, Transvaal, ii.1964, M. J. Mynhardt, with *Nipaecoccus graminus* (Cockerell) on grass.

REMARKS. This new species is not closely allied to the other African species dealt with here and is readily separated from them as shown in the foregoing key. *Rhopus (Xanthoencyrtus) geminus* is, however, very similar to *R. (Xanthoencyrtus) nigriclavus* (Girault) from Australia. The single slide-mounted female type-specimen (in Queensland Museum, Brisbane, Australia) of the latter species, which was redescribed and illustrated by Subba Rao & Hayat (1978) is available for study. The poorly preserved specimen does not permit detailed comparison of certain characters, but it seems that *nigriclavus* differs mainly from *geminus* in the antennal funicle which is more slender, the basal segment being quadrate, not wider than long, the distal segment only slightly wider than long, not about 1,5 times as wide as long as in *geminus*. Antennal coloration also differs to some extent: in *nigriclavus* the funicle is largely pale and the club black in contrast; in *geminus* the club is only slightly darker than the funicle, the whole flagellum appearing generally blackish-brown.

Rhopus (Xanthoencyrtus) urbanus spec. nov., Figs 20–24

FEMALE. Described from slide-mounted material only. Length: about 0,8 mm. Colour: entire insect, including legs, yellowish, the mesoscutum with slightly darker suffusions anteriorly; antenna brownish; wings hyaline.

Head, in frontal view (Fig. 23) 1,4 times as wide as the frontovertex at median ocellus; lateral ocelli separated from each other by about 5,0 times their own diameter, 2,5 times their diameter from the inner eye margins; eyes 1,5 times the length of the malar space; scrobes indiscernible in the slide-mounted holotype; toruli very close to the mouth margin, separated from each other by 1,7 times their own diameter. Antenna (Fig. 21) with scape about four times as long as broad; pedicel as long as the basal two and one-half of the third funicle segments combined; funicle with all segments wider than long; segment I–II almost equal, slightly wider than long, III and V subequal, notably larger than IV; segment VI the largest, 1,2 times as wide as long; club two-segmented, slightly longer than the distal five funicle segments combined; funicle segments III, V and VI, and club with rhinaria. Sculpture clearly visible; posterior part of the frontovertex to a level just anterior to the median ocellus consisting of narowly spaced, irregularly shaped transverse lines which do not connect to form distinct cells; anterior part of frontovertex and face with transverse lines more regular and more widely spaced to form large, ill-defined sculptural cells; setation as in Fig. 23; eyes distinctly pubescent.

Pro-and mesonotum as in Fig. 22; mesoscutum and scutellum respectively 1,5 and 1,2 times as wide as long; mesoscutum fairly densely setose, with more or less 80 slender setae; axillae each with four setae; scutellum not as densely setose as in *notius* and *adustus*, with 33 fairly long discal setae in addition to one strongly developed apical pair; sculpture of mesoscutum and scutellum much the same, finely cellulate-reticulate, the cells large.

Fore wing (Fig. 20) about 2,5 times as long as wide; marginal fringe short, the longest cilia about 0,14 times as long as the width of the wing; basal part of wing disc with setation much as in the previous species, except that the speculum is interrupted by a few setae in its caudal half; marginal vein longer than the postmarginal, the latter almost punctiform; hind wing 5,8 times as long as broad; longest marginal cilia about one-half as long as the width of the wing.

Ovipositor 0,5 times as long as the middle tibia, not protruding at the gastral apex.

MALE. Colour: appearing much the same as the female in the slide-mounted paratype. Differing structurally as follows: toruli with their upper limits slightly above the lower eye margins, 1,5 times their own diameter apart; scutellum, in the single specimen, as long as wide, not wider than long as in the female; antenna (Fig. 24) with scape 2,8 times as long as wide, the pedicel a little shorter than the basal funicle segment; funicle segments all longer than broad as illustrated, segment VI about 1,8 times as long as broad; club as long as the distal two funicle segments combined; funicle segment VI with a row of scale-like setae typical of the genus; all funicle segments except II with rhinaria.

MATERIAL EXAMINED. Female holotype, 1 male paratype as follows: SOUTH AFRICA: Pretoria, Transvaal, xi.1965, M. J. Mynhardt, ex *Paracoccus burnerae* (Brain) on unknown plant (T 2052).

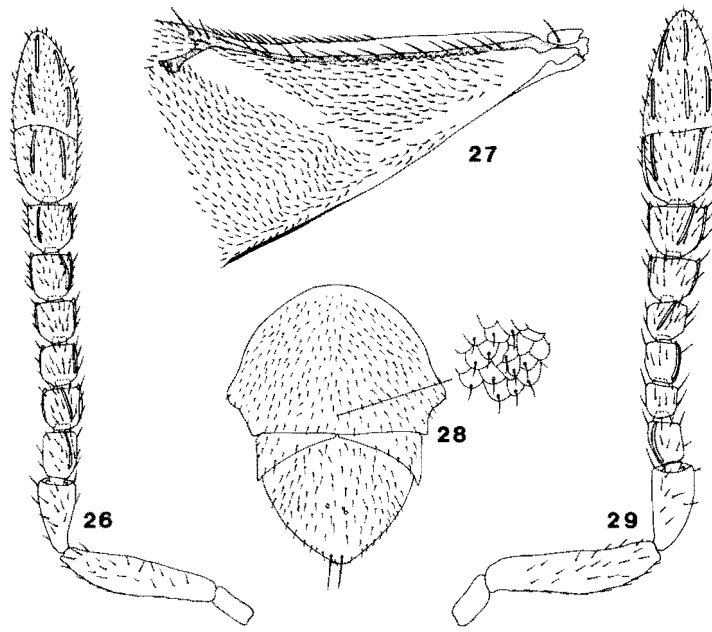
REMARKS: This new species is more closely allied to *R. (Xanthoencyrtus) notius* and *adustus* than to *geminus*, and it resembles, in the female, the former two species in the broader fore wing and shorter marginal fringe, the interrupted speculum, the more densely setose mesonotum and the antennal pedicel which is plainly shorter than the basal three funicle segments. *R. urbanus* is separated from *notius* and *adustus* as shown in the foregoing key.

Rhopus (Xanthoencyrtus) notius spec. nov., Figs 25–28

FEMALE. Length: about 0,8–1,0 mm. Colour: head, body and legs (except the dark tarsal tips) unicolorous, yellow; antennal radicle, scape and pedicel much the same, except for the apex of the scape and base of the pedicel which have darker suffusions; flagellum blackish-brown; wings hyaline.

Head, in frontal view (Fig. 25) about 1,7 times as wide as the frontovertex at median ocelli; lateral ocelli 2,5 times to almost three times their own diameter from the lateral eye margins; scrobes short, visible as two slightly diverging shallow furrows, separated by a broad, weakly convex prominence; toruli a little less than twice their own diameter apart; eyes 1,7 times as long as the malar space. Antenna generally shaped as in Fig. 26, the dimensions varying considerably in the ten available slide-mounted specimens, even amongst specimens of the same series; scape 3,5–4,0 times as long as broad; pedicel ranging from as long as the basal one and a half funicle segments to the basal two funicle segments combined; funicle with all segments approximately rectangular in shape; segment I always longer than wide, 1,3–1,5 times as long as broad; segments II–VI subequal in size or with VI larger than the preceding segments, the segments ranging from a little longer than wide to wider than long, but often quadrate; club two-segmented, ranging from a little shorter than the distal four segments to almost as long as the distal five together; all club and funicle segments with rhinaria. Sculpture as shown in Fig. 25, the vertex consisting of narrowly spaced, somewhat thickened transverse lines which mostly do not form cells, the lines becoming a little finer and more broadly spaced on the face; frontal aspect of head very densely setose as in Fig. 25; eyes distinctly pubescent.

Mesonotum (Fig. 28) with mesoscutum and scutellum respectively 1,3 and 1,2 times as wide as long; mesonotum very densely setose, the setae short and fine; axillae



Figs 26–29. *Rhopus (Xanthoencyrtus)* spp. 26–28. *R. notius* spec. nov., female paratype. 26. Antenna. 27. Basal part of fore wing. 28. Mesonotum, with sculpture of mesoscutum enlarged. 29. *R. adustus* spec. nov., antenna, female paratype.

each with eight to ten setae, the scutellum with at least 70 setae in addition to the strongly developed apical pair; sculpture of mesoscutum as shown in Fig. 28, that of the scutellum much the same.

Fore wing 2,5–2,6 times as long as wide; marginal fringe short, the longest cilia less than 0,1 times as long as the width of the wing; basal part of fore wing very densely setose as in Fig. 27, leaving only a narrow caudal asetose streak which joins up with the speculum, the latter interrupted by a few setae in its caudal half; postmarginal vein very short to almost punctiform, shorter than the marginal vein. Hind wing more or less six times as long as wide, the longest marginal cilia about 0,4 times as long as the width of the wing.

MALE. Colour: differing from the female in that the whole insect is a little darker, generally pale brown, the antenna more or less uniformly brownish, not bicolorous. Differing in structure as follows: vertex slightly broader, the head 1,5 times as wide as the former at median ocellus; eyes smaller, 1,3 times as long as the malar space; toruli with their upper limits about level with the lower eye margins; antenna typical of the genus, the general shape as illustrated for *urbanus;* scape about 2,6 times as long as broad; pedicel about one-half the length of the basal funicle segment; basal funicle segment notably longer than each of funicle segments II–V which are subequal

in length, about as long as VI; club just shorter than the distal two funicle segments combined; all funicle segments with rhinaria; funicle segment VI with a row of scale-like setae.

MATERIAL EXAMINED. Female holotype, 16 female, 4 male paratypes as follows: SOUTH AFRICA: Paarl, Cape Province, x.1972, S. Neser, ex mealybugs on *Aspalathus spinosa* (female holotype, 2 female paratypes, T 4515); Franschhoek, C.P., iv.1978, S. Neser, ex mealybugs on *Passerina vulgaris* (3 females, T 5365); Du Toits Kloof, C.P., xii.1965, D. J. Rust, ex *Vryburgia* sp. on *Leucodendron daphnoides* (7 females, 1 male, T 2127); Stellenbosch, C.P., ix.1965, V. B. Whitehead, same host data (4 females, 3 males, T 2022); 2 female paratypes in BMNH.

REMARKS. This new species closely resembles *R. (Xanthoencyrtus) adustus* in structure, and much of the material from which the two species are described were collected in the same area. The two species differ, however, in colour and antennal structure, as shown in the foregoing key.

Rhopus (Xanthoencyrtus) adustus spec. nov., Fig. 29

FEMALE. Length: 0,7–1,0 mm. Colour: head and body brown to dark brown, the face below the eyes fading to yellow, the tegulae pale, the lateral margins of the scutellum just below the axillae each with an elongate yellowish marking; in some specimens the pronotum and anterior margin of the mesoscutum, the axillae and the base of the gaster are of a darker shade of brown than the remainder of the body; antenna more or less uniformly brown; legs sordid white to pale brown, semitranslucent in some specimens; wings hyaline.

Head, much as illustrated for *R. notius*, 1,7 times as wide as the frontovertex at median ocellus; lateral ocelli 1,8–2,2 times their own diameter from the inner eye margins; scrobes indistinct in dry as well as slide-mounted material; toruli separated from each other by about twice their own diameter. Antenna (Fig. 29) with dimensions varying in the available slide-mounted material; scape 3,5–4,0 times as long as broad; pedicel usually as long as the basal two funicle segments combined, but also slightly longer; basal funicle segment longer than wide, 1,2–1,5 times as long as broad, longer than segment II; segments II–VI ranging from slightly longer than wide to wider than long, varying also in size in relation to one another, segments II–IV usually smaller than V which is a little smaller than VI; segment VI in most specimens about 1,2 times as wide as long; club about as long as the distal four and half of the fifth segment together, two-segmented, distinctly clavate; all funicle segments except II with rhinaria. Sculpture of head much as in the previous species, except that the sculptural lines are a little thicker, lending the integument a slightly coarser appearance in dried specimens; setation of the same density as in *notius*, but the setae appearing a little shorter; eyes pubescent, but not appearing distinctly hairy under low magnification.

Thorax with mesoscutum broader than in *R. notius*, the mesoscutum 1,6–1,7 times as wide as long, the scutellum 1,1 times as wide as long; scutellum less densely setose than in *notius*, with at most about 50 setae in the slide-mounted material; axillae each with 8–12 setae.

Fore wing 2,4–2,5 times as long as wide; longest marginal cilia ranging from 0,05–0,09 times as long as the width of the wing; setation and venation much as illustrated for the previous species, the postmarginal vein very short to punctiform; hind wing more or less 6 times as long as broad, the longest marginal cilia about 0,4 times as long as the width of the wing.

Ovipositor about 0,75 times the length of the middle tibia, the gonostyli 0,5 times as long as the middle tibia spur.

MALE. Colour: as in the female except for the lower part of the head which is more extensively marked with yellow to include the genae and temples in most specimens. Differing structurally as follows; head about 1,6 times as wide as the frontovertex; eyes smaller, 1,2–1,3 times as long as the malar space; toruli with their upper limits level with the lower eye margin; antenna generally structured as illustrated for *R. urbanus*; scape more or less 3,5 times as long as broad, the pedicel a little shorter than the basal funicle segment; funicle segments subequal in size; club slightly shorter than the distal two funicle segments together; all funicle segments with rhinaria; axillae with fewer setae, usually 5–8, in one specimen with only two setae on the one axilla; fore wing with marginal fringe slightly longer in relation to the width of the wing.

MATERIAL EXAMINED. Female holotype, 36 female, 32 male paratypes as follows: SOUTH AFRICA: Cape Province: Darling, x.1969, H. P. Insley, ex mealybugs on *Aspalathus* sp. (female holotype, 19 females, 15 males, T 3189); Tulbagh, vi.1978, S. Neser, ex *Paracoccus ? mutabilis* De Lotto on *Aspalathus spinosa* (15 females, 15 males, T 5461); Vogelvlei, nr. Hermon, iv.1978, S. Neser, with coccids on *Aspalathus acuminata* (2 females, 2 males, T 5411); 4 female, 4 male paratypes in BMNH.

The following series from South West Africa has not been included in the type-material: Khorixas, ii.1978, C. Kok, ex mealybugs on *Welwitschia mirabilis* (7 females, 7 males, T 5391). Apart from colour, the specimens of this series do not differ significantly from the types; they are generally a little paler, the head and thorax being suffused with yellowish-brown in most parts. It is most likely that the mealybugs from which this series was reared are *Paracoccus mutabilis* De Lotto, a species commonly found on welwitschias. Interestingly, one of the type-series mentioned above was reared from *Paracoccus ? mutabilis* on *Aspalathus* in the south western Cape.

REMARKS. This species closely resembles the previous one as mentioned above and differs, in the female, mainly in the darker body colour and unicolorous antenna, in antennal shape, and in the absence of rhinaria on the second funicle segment. It is described above with reference to *notius*.

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REFERENCES

ERDÖS, J. 1957. Series Encyrtidarum novarum Hungaricarum. *Acta Zoologica Academiae Scientarum Hungaricae* **3:** 5–87.

FOERSTER, A. 1856. *Hymenopterologische Studien. 2. Chalcidae und Proctotrupii.* 152pp. Aachen.

HAYAT, M. 1969. Three new species of Encyrtidae (Hymenoptera: Chalcidoidea) from India. *Bulletin of Entomology* **10:** 110–115.

HOWARD, L. O. 1898. On some new parasitic insects of the subfamily Encyrtinae. *Proceedings of the United States National Museum* **21:** 231–248.

NOYES, J. S. & M. HAYAT. 1984. A review of the genera of Indo-Pacific Encyrtidae (Hymenoptera: Chalcidoidea). *Bulletin of the British Museum (Natural History). Entomology Series* **48:** 131–395.

PRINSLOO, G. L. & D. P. ANNECKE, 1979. A key to the genera of Encyrtidae from the Ethiopian region, with descriptions of three new genera (Hymenoptera: Chalcidoidea). *Journal of the Entomological Society of Southern Africa* **42:** 239–382.

SUBBA RAO, B. R. & M. HAYAT. 1979. A note on the genus *Scelioencyrtus* Girault and description of a new genus, *Hamusencyrtus* (Hymenoptera: Encyrtidae) from India. *Journal of Entomological Research* **2:** 1–4.

TIMBERLAKE, P. H. 1920. Descriptions of new genera and species of Hawaiian Encyrtidae (Hymenoptera), II. *Proceedings of the Hawaiian Entomological Society* **4:** 409–437.

TRJAPITZIN, V. A. 1962. Encyrtidae (Hymenoptera) – parasites of *Nipponaclerda turanica* (Arch.) (Homoptera, Acleridae) in Nogai steppe. (In Russian). *Zoologicheskii Zhurnal* **41:** 560–570.

TRJAPITZIN, V. A. 1973. Classification of the parasitic Hymenoptera of the Family Encyrtidae (Hymenoptera, Chalcidoidea). Part II. *Entomological Review, Washington* **52:** 287–295.

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